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AUTHOR Ozgener, Esen Sever
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ABSTRACT

This multiple case study investigated the relationship between kindergarten teachers' questions and children's responses. The classroom discussions of 4 groups of children and their teachers (all middle income level) were taped and classified into five different question and response categories. Results indicated that: (1) some teachers ask more questions than others; (2) cognitive-memory and convergent questions were asked more frequently than evaluative, divergent and routine questions; and that (3) the level of responses given by students was highly congruent with the level of questions asked by teachers. Results suggest that more questions should be asked in the evaluative and divergent thinking areas in order to encourage creative responses. A need for teacher training in asking questions which elicit higher order cognitive responses is seen. (RH)

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TEACHERS NEED TO ASK CREATIVE TYPE QUESTIONS!

Esen Sever Ozgener
Prof. of Early Childhood Ed.
Dept. of Home Economics
Tenn. State University

Preparation for intelligent and independent thought can begin as early as the pre-school years. Practice in productive thinking in early years at home and at school, prepares children to think on their own. According to Paul Torrance, five year olds creativity score fall approximately in the middle of the kindergarten year. However, when these children are exposed to a program encouraging creative thinking, the results indicate growth in this process¹.

Earlier studies on the kindergarten level shows that the majority of questions asked by kindergarten teachers are in the cognitive-memory category². This study illustrates that there is a direct relationship between teachers' questions and student's responses. The study also confirms the earlier findings that teachers ask majority of their questions in cognitive-memory category. Therefore, it is clear that teachers' limited questioning skills are not conducive to the development of creative thinking which is indispensable in a free democratic society.

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¹Paul E. Torrance, Laura R. Fortson and Larry E. Orcutt, "The Creative-Aesthetic Approach to School Readiness and Measured Creative Growth," Research and Development Center in Educational Stimulation, University of Georgia, ERIC No. Ed 017 344 (July, 1967), p. 4.

²Marilyn M. Smith, "Dialectical and Didactic Instructional Methods: Their Relationship to Changes in Kindergarten Teachers' Questioning Behaviors," (unpublished Ed.D. dissertation, George Peabody College for Teachers, 1970), p. 32.

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Purpose of the Study

The purpose of this study was to investigate the relationship between kindergartenteachers' questions and students' responses. It proposed to study this problem by asking the following questions: Does the cognitive performance (questions asked) of kindergarten teachers differ? Do kindergarten teachers ask more cognitive-memory questions than questions from any other category? Do questions asked in a specific category elicit responses form the same category as that in which the question had been asked?

Theoretical Base

The definitions of thought processes used in the current study (cognition and memory, convergent thinking, evaluative thinking, divergent thinking) are similar to those formulated in the theoretical structure developed by Guilford³. Gallagher used the Guilford model with some adaptation. He combined cognitive and memory factors into one category and added a routine category. He utilized this system for the improvement of teaching⁴. In the current study, the researcher analyzes the exchange of thought processes between teachers and students in their verbal question--response discourse.

³Guilford, "The Structure of Intellect," pp. 267-291.

⁴James J. Gallagher, "Structure of Intellect" in Conceptual Models in Teacher Education, ed. by John R. Verduin, Jr. (Washington, D.C.: The American Association of Colleges for Teacher Education, 1967), pp. 85-86.

For this purpose, the Aschner--Gallagher category system based on Guilford's Structure of Intellect is used.

Procedure

Four case studies were conducted by the researcher. The four groups of kindergarten students and their teachers were matched in terms of comparable economic backgrounds--a middle income level population. The students were also matched in terms of their age level; all children observed were in the kindergarten group. All the teachers had college education.

The content of teachers' questions and students' responses was taped as a typical unrehearsed discussion took place between fifteen to twenty children and a teacher. The recorded questions and responses were classified into Aschner and Gallagher's five categories (Routine, Cognitive--Memory, Convergent, Evaluative, and Divergent) by the researcher and another analyst. These classifications were compared for the purpose of obtaining inter-rater reliability.

Results

Pearson χ^2 and goodness of fit tests were used to test the frequency of teacher questions and the relationship between teachers' cognitive performance (questions asked) and students' cognitive performance (responses elicited).

The cognitive performance (questions asked) of kindergarten teachers differed in frequency from one teacher to another. In general, a high number of questions was asked in

the Cognitive-Memory and Convergent categories, and a very low number of questions in the Evaluative, Divergent, and Routine categories. The number of questions in the Routine category, in which no cognitive thought process on the part of the student was necessary, was low compared to the number of Cognitive-Memory and Convergent questions. The number of questions in the Cognitive-Memory was significantly high, however, a significant number of questions were in the Convergent category, the first category that could be classified under productive thinking.

A very high incidence of congruence between teachers' level of thinking (in terms of questions asked) and students' level of thinking (in terms of response given) was found in this investigation.

Implications

The question-response exchanges between teachers and students can develop the level of thinking in the classrooms if these exchanges occur in high levels of thinking. Knowing that children are at the peak of their creativity at the beginning of the kindergarten year, this researcher expected to find less congruence between teachers' questions and students' responses at the kindergarten level. Questions and responses are interrelated even when children are in their most creative years; thus, if teachers ask more of their questions in the Divergent category, they can encourage children not to lose their creativity.

The teacher education student needs to be aware of the importance of questions asked to students on a variety of thought levels. He can learn to ask questions for the purpose of encouraging particular cognitive processes.

The results of this study and other studies show that more questions need to be asked in the Evaluative and Divergent thinking areas. Teachers can learn to analyze their own questioning behavior by categorizing the questions that they ask and thus can be aware of the kind of thinking they impose on their students.

Student teachers, through the practice of asking questions on higher levels of thinking, can develop behavior patterns for higher cognitive operations. Teachers who have had training in asking productive questions will trigger higher levels of thinking in their students. Teacher training should concentrate on the practice of question-asking skills under proper guidance. Individual conferences, group conferences, supervisory evaluation, modeling, microteaching, and self-evaluation are effective techniques for this kind of practice.

TABLE 1.—Distribution of Teacher Questions

Types of Questions					Total Asked
Routine	Cognitive- Memory	Convergent	Evaluative	Divergent	
E O %	E O %	E O %	E O %	E O %	
74.2 58 15.6	74.2 142 38.3	74.2 129 34.8	74.2 25 6.7	74.2 17 4.6	371

TABLE 2.—Relationship Between Teachers' Questions
and Students' Responses

TEACHERS' QUESTIONS	STUDENTS' RESPONSES										Total (Observed)
	Routine		Recall		Reasoning		Decision-Making		Creative		
	E	O	E	O	E	O	E	O	E	O	
Routine	2.7	14	26	22	20.5	11	5.2	5	4.0	5	58
Cognitive-Memory	6.5	2	63.5	133	50.1	3	12.6	2	9.2	2	142
Convergent	5.9	1	57.5	9	45.5	117	11.5	1	8.3	1	129
Evaluative	1.1	0	11.2	1	8.8	0	2.2	24	1.6	0	25
Divergent	0.8	0	7.6	1	6.0	0	1.5	1	1.1	15	17
Total		17		166		131		33		24	371

Routine Questions and Responses

Questions in this category do not require thinking process on the part of the student. Teacher calls on the student without designating content, asks for imitation, repeats child's answer in question form, and asks for agreement.

Teacher: Shall we open a seed pod and
see what the seeds look like?
All: Yes.

Teacher received the agreement that she was seeking from the students.

Teacher: Anybody else got another thought?
Student: Me.

Teacher calls on students without designating any content.

Student's response contains no content.

Teacher: Can you say that word?
Student: Terminal.

Teacher requests the student to repeat a word that the student had just said; child imitates.

Student: Teacher, I have a new pet.
Teacher: You have a pet?
Student: Yes, I have a new dog.

Teacher repeats child's statement in question form and child repeats his statement.

Cognitive-Memory Questions and Responses

Questions in this category ask for a description or definition of a thing or event that had been taught or discussed previously. The cognitive processes of recall, rote memory, and/or recognition are called into operation.

Teacher: What else did you see?

Student: I saw a fire station.

Teacher asks for recall of a past event. Child recalls it.

Teacher: What does it mean 1970?

Student: There are 1970 quarters.

Teacher asks for clarification, which she receives.

Teacher: What do you see in this photograph?

Student: I see some trees, moon and stars.

Teacher asks for description of things in the surrounding environment. Recognition on the part of the students is necessary.

Convergent Questions and Reasoning Type Responses

Questions in this category require such thought processes as translation, association, explanation, and conclusion. A right answer is reachable on the basis of "givens" or known facts:

Teacher: How would your skin feel if you were a bear?

Student: Warm.

Teacher asks for translation from semantic to figural representation.

Teacher: What makes you think that is from a cat?

Student: It feels like the cat's fur.

Teacher asks for explanation.

Teacher: I want to know which is the tallest animal on this board.

Student: Giraffe.

Teacher asks for association requiring ordering.

Teacher: This picture reminds me of a certain time of the year. What time of the year do you think it is?

Student: Fall.

Teacher asks for a conclusion.

Evaluative Questions and Decision-Making Type Responses

Questions and responses in this category "deal with matters of judgment, value and choice."⁵

Teacher: Which animal would you most like to be?

Student: I would like to be a reptile.

The responder's answer is based on his own choice.

Teacher: Is a pirate a good person or a bad person?

Student: Bad.

Use of judgment is necessary on the part of the responder.

Divergent Questions and Creative-Type Responses

There is no one right answer to a Divergent question. Questions encourage freedom of thought, imagination, and invention of various solutions to problems.

Teacher: What would you do if you were an alligator?

Student: I would eat people up.

Teacher: Why do you wear masks?

Student A: To scare people.

Student B: To be funny.

Student C: So they won't see your face.

⁵James J. Gallagher and Mary Jane Aschner, "A Preliminary Report on Analyses of Classroom Interaction," Merrill Palmer Quarterly, IX (1963), p. 186.

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